International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 2018 vol.18 N2.2, pages 73-80

Analysis of the terrestrial pole coordinates using regression dynamic modeling

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© SGEM 2018. For processing observations of the terrestrial pole dynamics, the regression dynamic modeling (RDM) approach was used. With the RDM software package the models describing the dynamics of the terrestrial polar coordinates were built. This approach provides accurate combined models of observations which describe to some extent causal and deterministic communication and provide forecast of characteristics. A comparison of observations and predicted values of the terrestrial polar coordinates obtained with the RDM approach and by other researchers is performed. To solve the problem, the expansion of the RDM automated systems was made. The basic version is supplemented by new software modules for the developed technique and geophysical observations features. The RDM software package intended for processing geophysical characteristics contains the modules as follows: 1) A spectral window to transform uneven observations to even ones; 2) Cross-spectral analysis to identify common significant harmonics of two observations; 3) Kalman Filter to eliminate noise from the residues of a model; 4) Fractal analysis to verify the series on trendstability; 5) Set of wavelets; 6) Processing scenarios to build the best on the "external" standard deviation model of (SD) model of Time series (TS) automatically.

http://dx.doi.org/10.5593/sgem2018/2.2/S08.010

Keywords

Regression dynamic modeling, Software package, Terrestrial pole coordinates

References

[1] Valeev S.G., Kuvayskova Yu. E. and Sukhareva E.V., Modeling of non-stationary time series based on the DRM approach and ARCH structures, Proceedings of the International Conference on Logic, Informatics, and Science: "Mathematical Methods and Models in science, technology, natural science and economics", Ulyanovsk: UlSTU, pp. 52-54, 2007.

[2] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin S.A., Selenocentric reference coordinates net in the dynamic system, Journal of Physics: Conference Series, Vol. 661, P. 012014, 2015.

[3] Demin S.A., Panischev O.Yu. and Nefedyev, Yu.A., Auto-and cross-correlation analysis of the QSOs radio wave intensity, Journal of Physics: Conference Series, Vol.

[4] [4] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin S.A., Selenocentric reference coordinates net in the dynamic system, Journal of Physics: Conference Series, Vol. 661, P. 012014, 2015.

[5] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin, S.A., Lorentzian' analysis of the accuracy of modern catalogues of stellar positions, Journal of Physics: Conference Series, Vol. 661, P. 012015, 2015.

[6] Lapaeva V.V., Meregin V.P. and Nefedjev Y.A., The Study of the Local Fluctuations of the Earth's Crust Using Data of Latitude Observations, Geophysical Research Letters, 32, L24304, 2005.

[7] Nefedyev Y., Valeev S., Mikee, R., Varaksina, N. and Andreev, A., Analysis of data of "CLEMENTINE" and "KAGUYA" missions and "ULCN" and "KSC-1162" catalogues, Advanced in Space Research, №50, pp. 1564 – 1569, 2012.

[8] Demin S.A., Panischev O.Yu. and Nefedyev Yu.A., Dynamic and Spectral X-Ray Features of the Micro-quasar XTE J1550-564, Kinematics and Physics of Celestial Bodies, 30, pp. 63-69, 2014.

[9] Sokolova M.G., Kondratyeva E.D. and Nefedyev Y.A., A comparative analysis of the D-criteria used to determine genetic links of small bodies, Advances in Space Research, Vol. 52/ Issue 7, pp. 1217-1220, 2013.

[10] Varaksina N.Y., Nefedyev Y.A., Churkin K.O., Zabbarova R.R. and Demin S.A., Selenocentric reference coordinates net in the dynamic system, Journal of Physics: Conference Series, Vol. 661, P. 012014, 2015.

[11] Sokolova M.G., Nefedyev Y.A. and Varaksina N.Y., Asteroid and comet hazard: Identification problem of observed space objects with the parental bodies, Advances in Space Research, Vol. 54/ Issue 11, pp. 2415-2418, 2014.

[12] Sokolova M., Nefedyev Y., Sergienko M., Demina, N. and Andreev, A., Analysis of the Lyrids' meteor stream structure for long timeslots, Advances in Space Research, Vol. 58/ Issue 4, pp. 541-544, 2016.

[13] Valeev S.G., Regressionnoe modelirovanie pri obrabotke nablyudenyi, Kazan: FAN, pp. 1-296, 2001.

[14] Usanin V., Nefedyev Y. and Andreev A., Use of long-term models for analysis of comet Encke's motion, Advances in Space Research, Vol. 58/ Issue 11, Pages 2400-2406, 2016

[15] Valeev, S.G., Kurkina, S.V. Programmnaya realizaciya DRM-podhoda dlya obrabotki i analysa vremennyh ryadov, Izv. vuzov. Geodeziya i aerophotos'emka, 2006, no. 5, pp. 10-21.